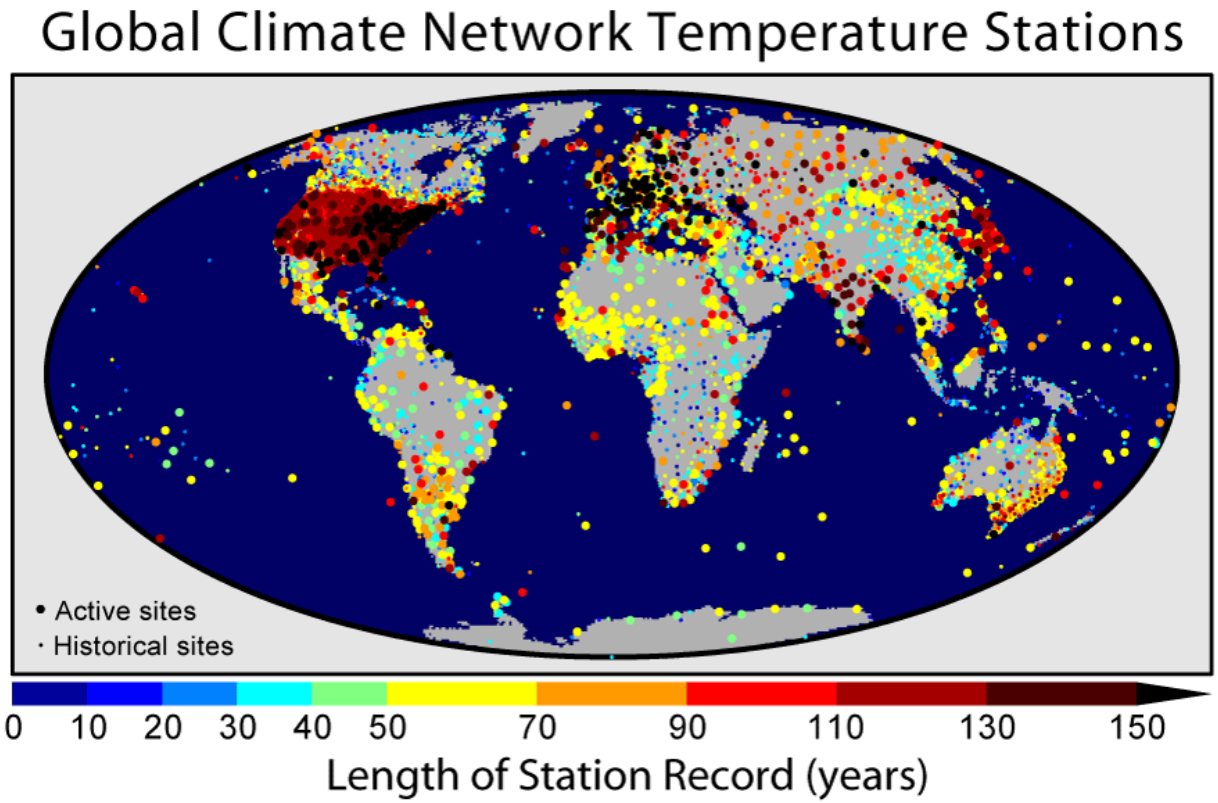
1) Global map of temperature stations

Show the classic map, except have the points appearing as a function of time – with a time counter starting in 1850

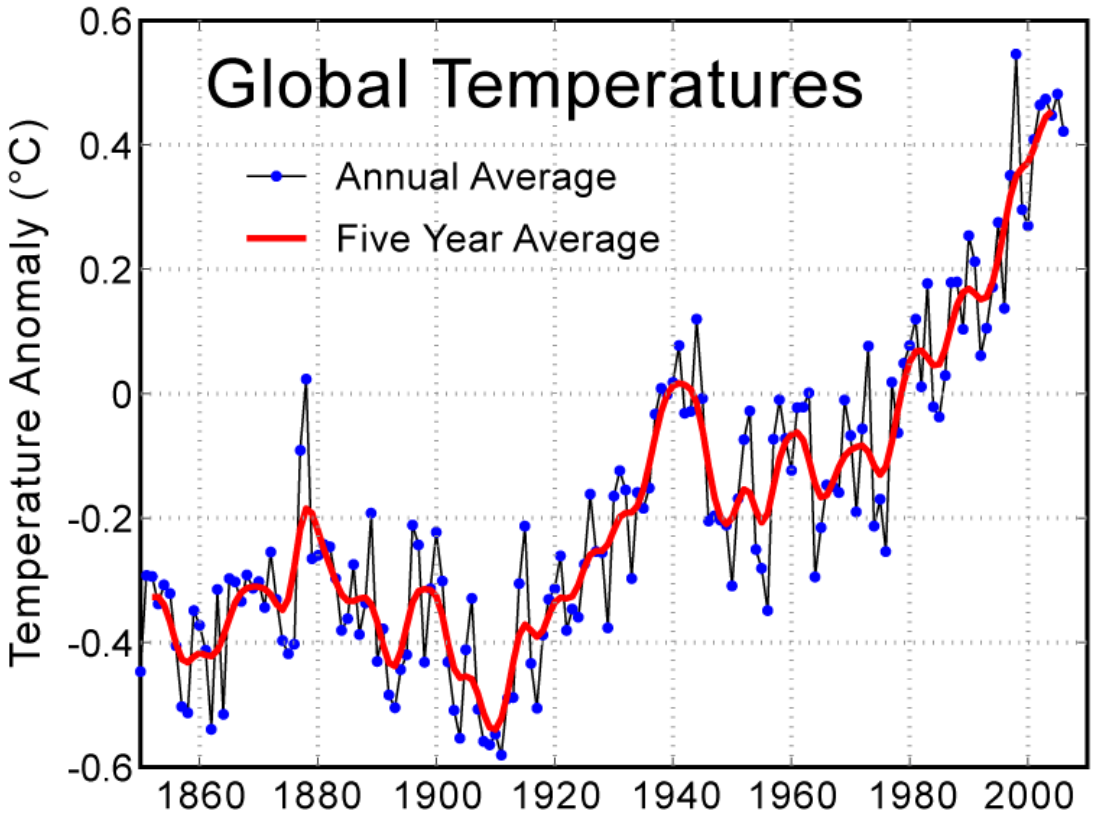


Script

We have measured the temperature of the Earth reliably for about the last 150 years

2) 150 years instrumental record

Here show the classic graph, but animated so that the yearly values are added sequentially.



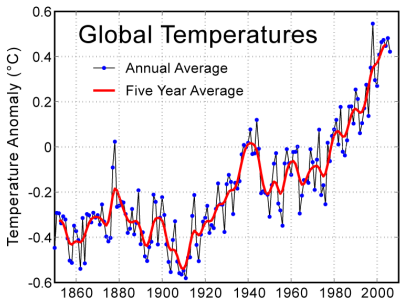
Script

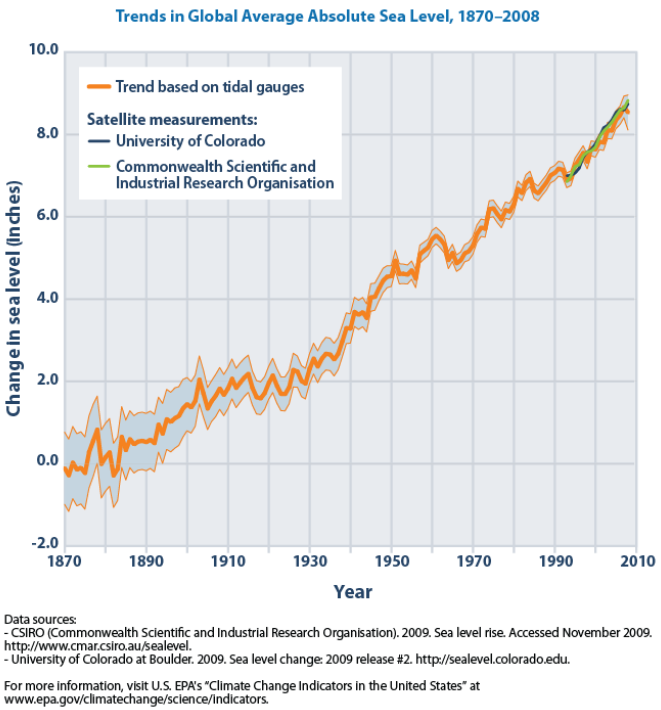
We know that temperatures have been rising on Earth from actual measurements from all over the world.

3) 150 years sea level

The temperature graph shrinks and moves to upper left.

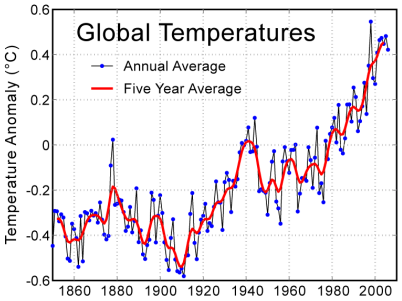
The classic sea level graph appears – also animated as the temperature graph before





Script

We also know – from measurements – that sea level has been slowing rising

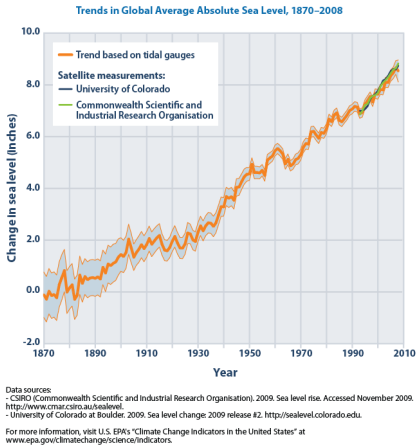


How are they connected?

4) But…how related?

Now the sea level graph shrinks and moves to lower left.

Text fades in!



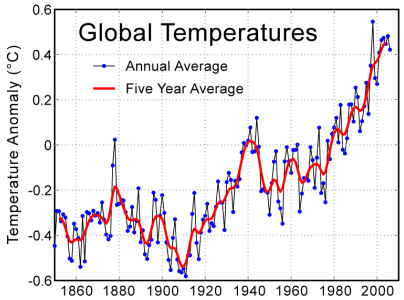
Script

But…how exactly are they connected?

5a, b, c) It's complex…

Now reveal gradually the bullet points (sorry E. Tufte…)

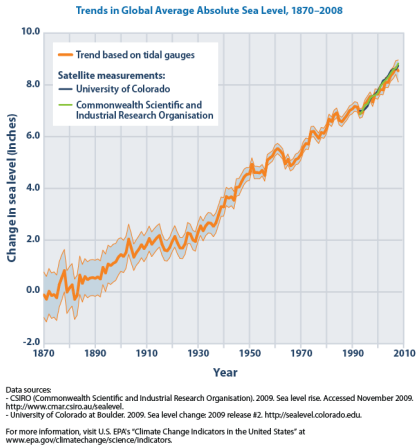
As these bullets appear show some cute animation below the bullets for each bullet.

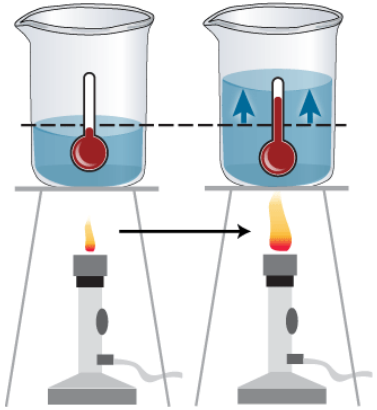


How are they connected?

Its complex…

1. Thermal expansion
2. Ocean circulation
3. More water from shrinking glaciers



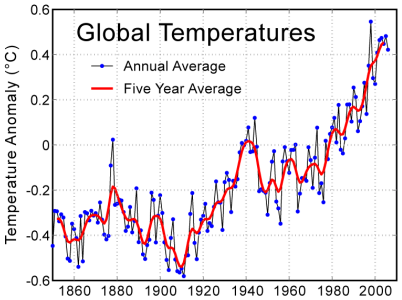


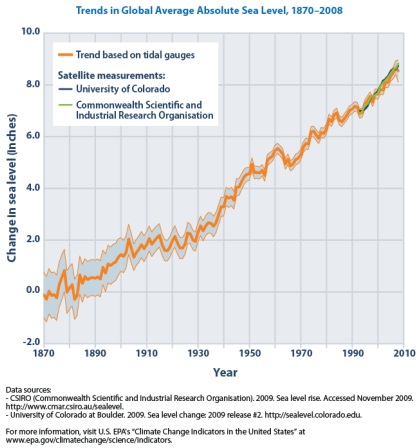
Script

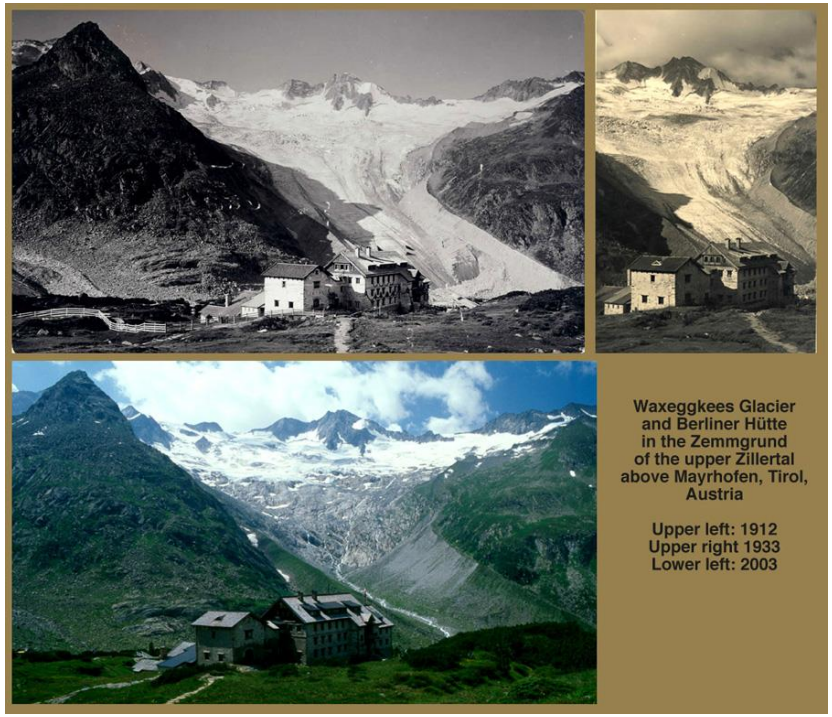
The connections are complex and include thermal expansion (warmer water is bigger), ocean circulation, and, yes, additional water in the ocean from shrinking glaciers. (think narrated in the Minute Physics Style.

6a, b, c) Examples of shrinking glaciers

Here show say 3 sets of glacier photos: 1 recent and 1 from a few decades ago with the old fading into the new.





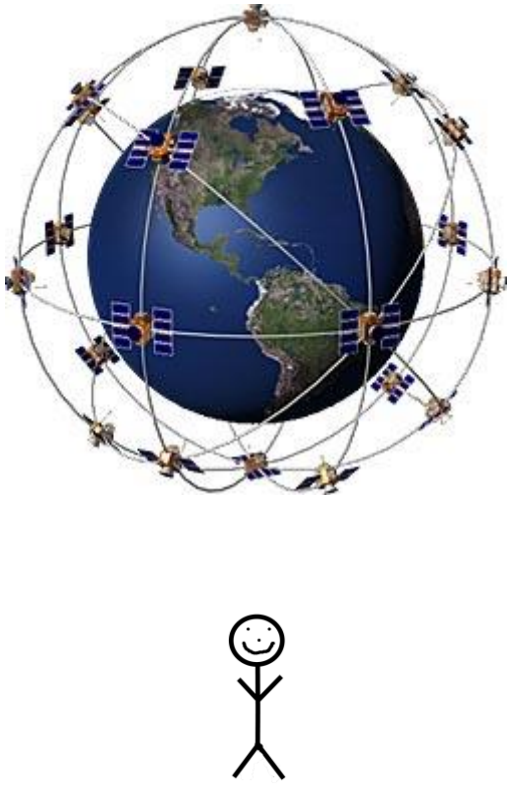


Script

Basic narration of the photographs.

7) But…how do we measure that?
Show one of these cute GPS animations with satellite orbiting the Earth and a stick figure on the ground with a GPS receiver.

How do we measure that?



Script
We can accurate measure the location of the glacier edge using a GPS receiver.

8) Stick Figure walking in Central Park

Here show the animated stick figure walking along with a smart phone and above a Google Map where the track is appearing as the stick figure walks

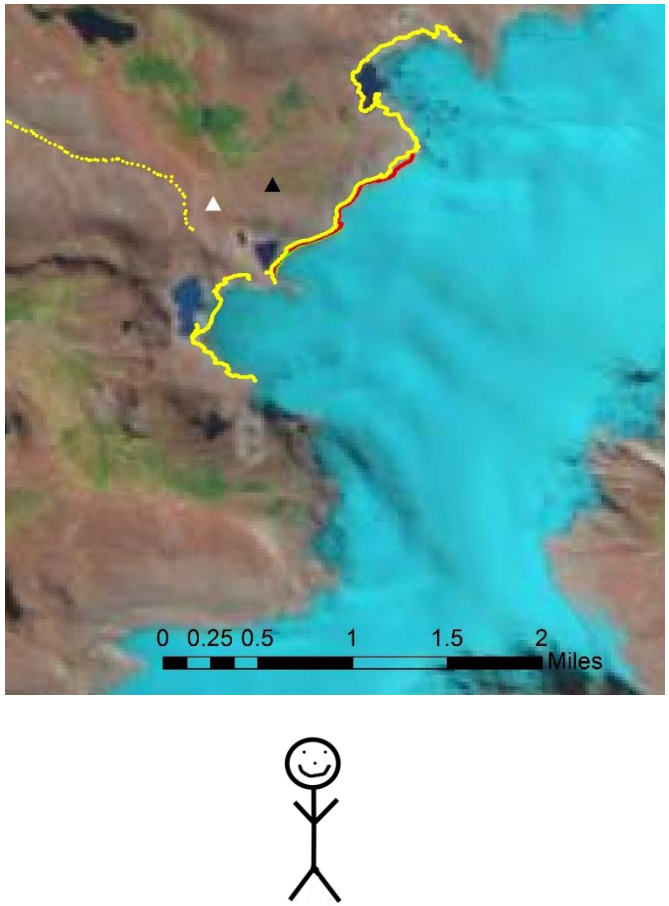
Script

The same way you can track your run through Central Park using your smartphone

9) Stick Figure walking along ice edge on satellite image

Same as 8), but now show the stick figure walking along the edge of QIC (or around the Furtwangler Glacier).

Imagine the image shown, but without the colored lines/dots, but a line appearing as the stick figure walks.

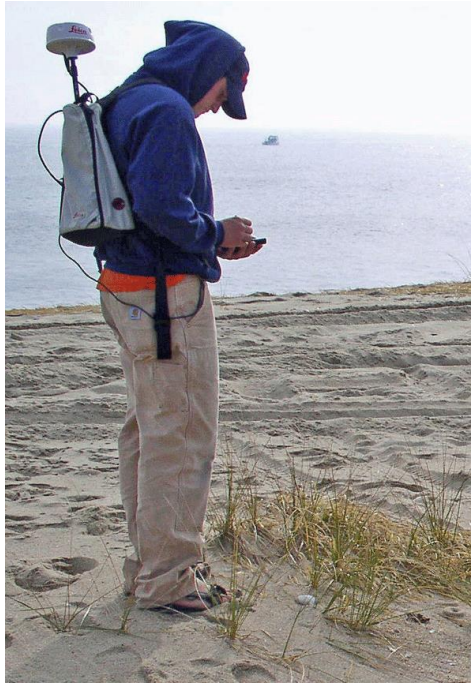


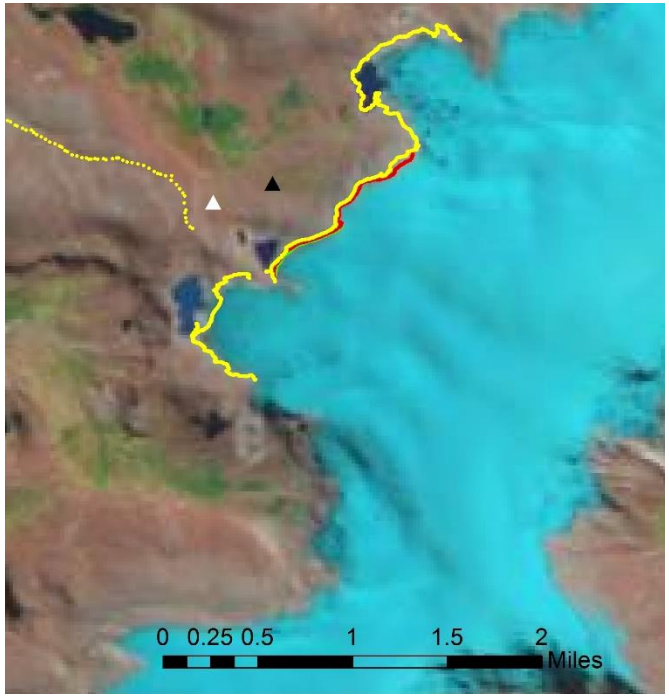
Script

You can track your hike along the edge of a glacier!

10) Add images of professional GPS setup

Add actual images we have from mapping QIC and the Furtwangler Glacier.

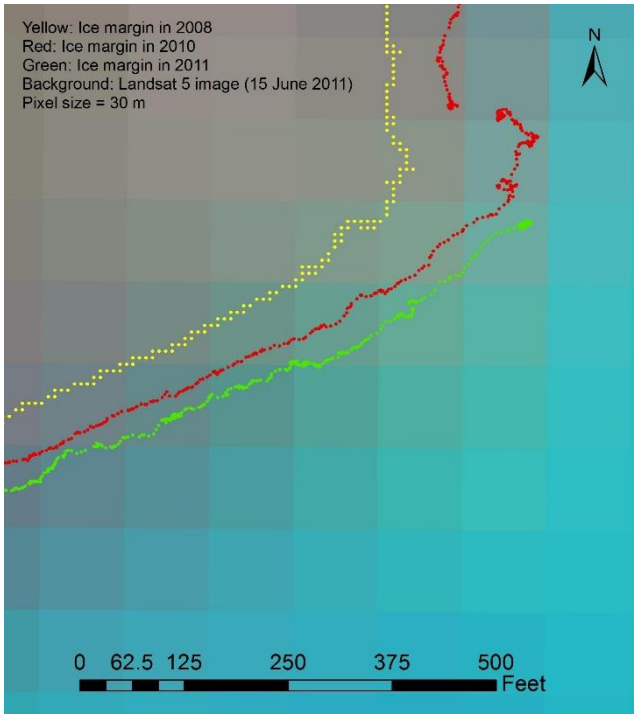




Script

Now – in reality you need to use more sophisticated equipment, but the basic process is the same as tracking your run through Central Park.

11) Stick Figure maps QIC!
Now use the most recent Geoeye image while the animated stick figure continues to walk.
Now the dots appear for the different years and the legend along with it.



Script
So here we have Peg Man walking along…in 2008, 2009, 2010, 2011, 2012, and 2013.

12) Stick Figure maps Furtwangler!
Same as 11) but for the Furtwangler Glacier on Kilimanjaro.

Script
So here we have Peg Man walking along…in 2008, 2009, 2010, 2011, 2012, and 2013.

13) Stick Figure and graphs
Now the satellite image fades out and get replaced by 2 x,y graphs showing the data

QIC

Furtwangler

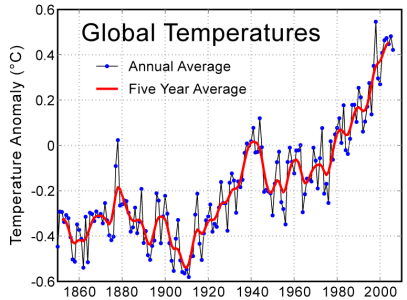
Script
So here we have Peg Man walking along…in 2008, 2009, 2010, 2011, 2012, and 2013.

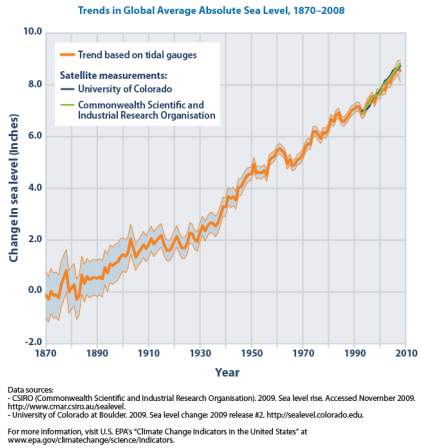
14) Back to Global View

Use the 2 figures from 4) and fade in a global glacier recession graph on the middle right.

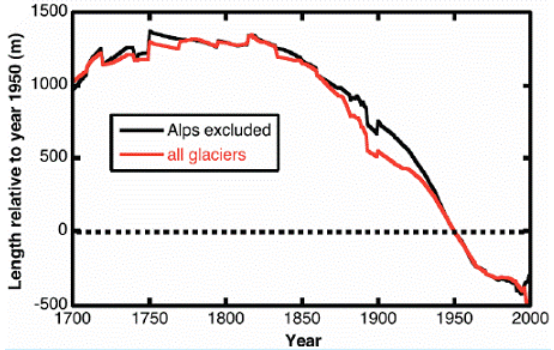
The word <u>coincidence</u> fades in.

Stick figure stops and scratches his/her head….





Coincidence?

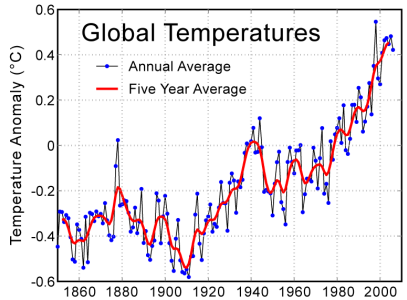


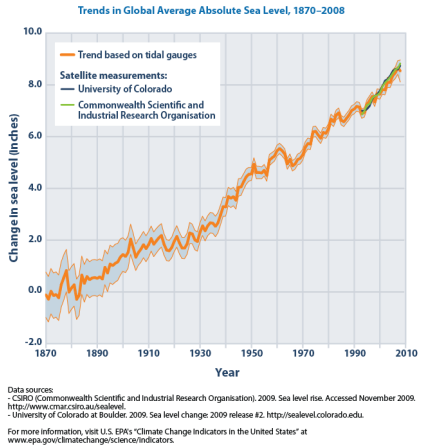
Script

So at the global scale we have rising temperatures, rising sea level, and shrinking glaciers…coincidence?

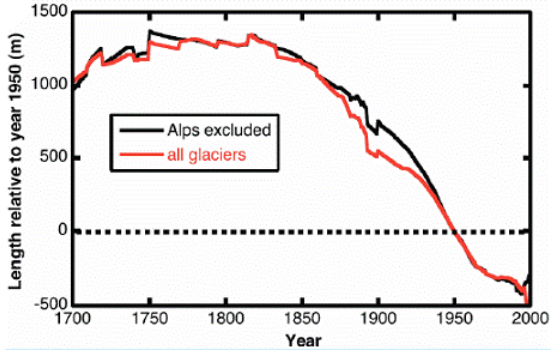
15) Stick Figure pollutes…
Stick figure gets in a car, starts driving all over the screen leaving black streaks behind until the screen is black!

The word coincidence fades into white an remains visible!





Coincidence?



Script
Nothing!

Coincidence?